(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 867 122 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
30.09.1998 Bulletin 1998/40

(51) Int Cl.6: **A23L 1/226**

(21) Application number: **98810204.2**

(22) Date of filing: **10.03.1998**

(84) Designated Contracting States:
AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.03.1997 CA 2199577**

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Ex. Notes AOI

(54) Grilled flavour composition and process to produce

(57) This invention is directed to the production of flavouring compositions obtained by heating a spray or atomized droplets of a saturated or partially saturated vegetable oil to a temperature of at least 480°C in an oxygen starved atmosphere in a fast pyrolysis reactor within 1.0 second. The process is further characterized in that the vegetable oil and the pyrolysis products produced from the vegetable oil are maintained at over 480°C for a period of time less than one second, and rapidly quenched, within 0.1 second, and the resulting liquid extract is separated and collected. The flavour compositions of this invention are further characterized in that they comprise a unique composition of flavour notes, and exhibit a full rich flavour complement. These flavour compositions are suitable for use as a food additive in order to enhance or provide food flavouring.

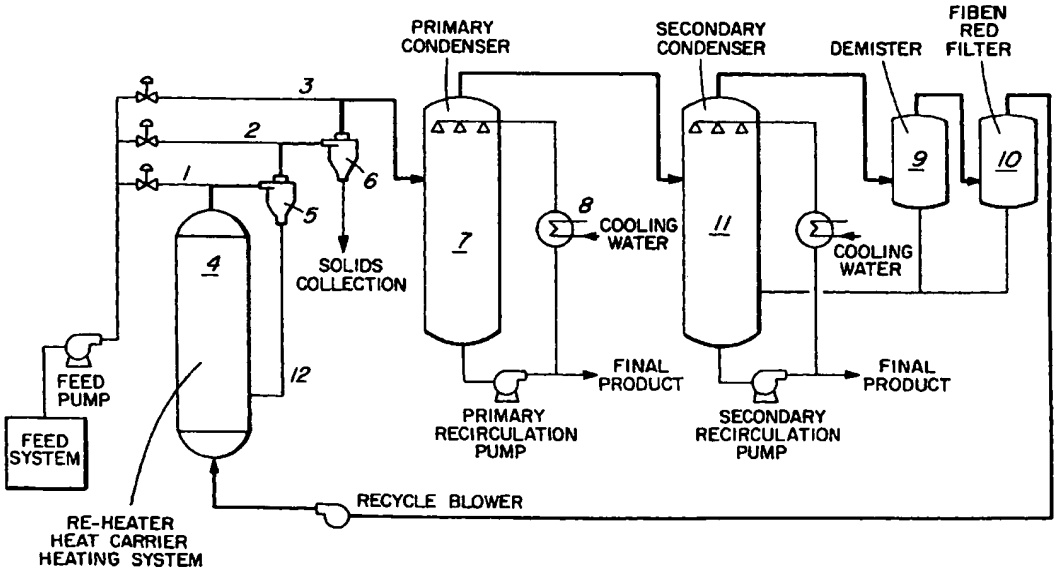

FIG. 1

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Description

This invention relates to a novel process for preparing a novel flavouring composition which is either utilized by itself or is blended with other flavouring compositions to be used to provide a charcoal or grilled flavour to foodstuffs, e.g. beef, fish, poultry, pork, etc.

BACKGROUND OF THE INVENTION

Food flavourings are used in the food industry in a variety of ways. One general type of food flavouring are those that add grilled or barbeque flavour to foods. Typical grilled flavours include those for the preparation of products wherein the content of meat is reduced or non-existent, for example in sauces, snack foods, meat substitutes, pet foods and the like. Such food flavourings can be sprayed onto the food stuffs, the food can be dipped in a solution of the flavouring, or applied in a variety of different manners. One such composition that provides an aspect of a grill flavour is that disclosed in US Patent No. 4,571,342 (DiCicca, 1986). This patent describes a flavouring composition with charred flavour notes which is prepared by subjecting a film of fat or oil to temperatures in the range of 150° C to 475°C in the presence of oxygen for an effective period of time followed by collecting the fat or oil. The method disclosed in US Patent No. 4,571,342 involves a continuous flow, thin film apparatus where fat or vegetable oil flows down a tube where a thin film of the fat or vegetable oil is formed around the inside circumference of the tube with a constant flow of air through the centre of the tube. Furthermore, the process is oxidative since heating of the vegetable oil is done in the presence of a substantial amount of oxygen.

A development on the flavouring composition described in US Patent No. 4,571,342 is disclosed in US Patent No. 4,820,538 (Schulman, 1989). It is disclosed that when one scales up the DiCicca process, there is an ineffective use of equipment and the reaction is inconsistent. As such, US Patent No. 4,820,538 teaches use of a rototherm to carry out the reaction in the presence of between 1 - 1 ½ parts of oxygen to 1 part fat or oil. Due to the presence of an equimolar ratio or more of oxygen, this reaction is an oxidative reaction carried out in a thin film heat exchanger. The period of time that the thin film remains in the heat exchanger is for a period of not exceeding 2 minutes and normally in the neighbourhood of 90 seconds. Upon exiting the heat exchanger the combustion products are quenched in less than 20 seconds and commonly in about 10 seconds.

This type of charcoal broil flavouring has achieved some commercial success. However, the product that is obtained utilizing this process has a limited flavour profile and level of flavour concentration. In addition, it is always desirable to have available new and different flavour notes that can be used either directly or in a blended form as a grilled food flavouring.

It has been known that some food flavourings can be made utilizing a fast pyrolysis reactor of the types disclosed in US Patent Nos. 4,876,108 and 4,994,297 (Underwood, 1989 and 1991, respectively). The food flavouring disclosed in US 4,994,297 comprises liquid smoke, obtained from the pyrolysis of wood or cellulose feed stocks, using the method disclosed in US 4,876,108, to produce a flavouring that is related, but quite distinct from the grilled flavourings described herein. The Underwood composition is made utilizing short residence times and is carried out in an oxygen starved atmosphere. Due to the lack of oxygen, the resulting reactions are reductive, not oxidative. For practical reasons, one never achieves a total absence of oxygen in such a process due to the partial difficulties of voiding all oxygen from a reactor system and therefore it would be understood that an oxygen starved atmosphere would have a limited amount of oxygen, i.e. less than 4% molar ratio of oxygen to feed stock.

The product made in accordance with the disclosure of US patents 4,876,108 and 4,994,297 has also achieved a fair amount of commercial success primarily as a meat flavouring composition having considerable browning characteristics, but does not provide flavour notes that extend beyond those associated with smoked flavours. In US 5,292,541 there is disclosed the production of a food browning material prepared from the pyrolysis of a sugar or starch feed stock. This product, while useful as a browning agent, lacks any appreciable flavouring ability and it is therefore quite distinct from the food flavouring as disclosed herein.

SUMMARY OF THE INVENTION

This invention is directed to the production of unique flavouring compositions. More specifically, this invention is related to the production of flavouring compositions with unique flavour notes using fast pyrolysis reactors and high stability vegetable oils or fats as feed stock.

It has unexpectedly been observed that use of apparatus of the type described in the Underwood patent (US 4,994,297), but utilizing as feed stock high stability vegetable oils or fats, instead of wood, results in flavouring compositions having uniquely distinct grilled flavour notes that are extremely smooth and lack harsh flavour notes. These flavour notes are distinct from the flavour notes or characteristics achieved using the similar feedstock in the apparatus and process of the DiCicca (4,571,342) and Shulman (US 4,820,538) patents. The distinct differences in flavour and

enhanced concentration indicates that a new and different composition results from the present process. Such a unique grilled flavouring is highly desirable for use in the food flavouring industry, since a reduced amount of flavouring (additive) can be used to achieve the desired flavouring. In addition, more pronounced flavouring can be achieved using equivalent amounts to other available grill flavourings.

The present invention utilizes high stability vegetable oils, that is to say, saturated, or partially saturated vegetable oils. It has been determined that saturated or partially saturated vegetable oils achieve a usable product whereas the utilization of unsaturated vegetable oils including some of those disclosed in the DiCicca and Shulman patents result in products having harsh flavour notes and are unacceptable. Furthermore, the enhanced flavour profile and higher flavour concentrations of the flavouring compositions of this invention are obtained through a fast pyrolysis reactor operating in the relative absence of air and at elevated temperatures. No flavour precursors were necessary to enhance the meaty flavour notes of the disclosed flavour compositions.

Therefore, this invention relates to a process for the preparation of a flavouring comprising:

a) heating a spray or atomized droplets of a saturated or partially saturated vegetable oil to a temperature of at least 480°C in an oxygen starved atmosphere in a fast pyrolysis system within 1.0 second;
b) maintaining the vegetable oil together with the pyrolysis products produced from the vegetable oil, at over 480°C for a period of time less than one second;
c) rapidly quenching the pyrolysis products formed within 0. 1 second;
d) separating and collecting said liquid extract.

This invention also embraces a process as defined above, wherein the vegetable oil is selected from the list comprising saturated or partially saturated palm oil, soya oil, peanut oil, canola, corn oil, coconut oil, animal fats, beef tallow, or butter. Furthermore, this invention relates to the use of saturated or partially saturated soya oil within this process.

This invention also provides a grilled flavouring composition which is made in accordance with the process as defined above. Furthermore, this invention is directed to a flavouring composition characterized in that it comprises a compound mix resulting in a gas chromatography fingerprint as that of table 1.

Furthermore, this invention embraces a grilled flavouring composition which contains the flavouring composition made by the process as defined above. This flavouring may be in a liquid, solid, cream, paste or powdered form, or in a spray dried form associated with an appropriate carrier such as malto dextrin or starch.

This invention also relates to a food flavouring comprising the grilled flavouring composition defined above together with other suitable food additives. This flavouring may be in a liquid, solid, sauce, cream, paste or powdered form.

This invention is directed to food to which has been applied the food flavouring defined above. This food is selected from, but not exclusively limited to, meat, poultry, sea food, milk products, vegetables, deep fried, surface fried, baked, micro waved, barbequed, grilled or snack foods.

This invention is directed to a flavouring composition characterized by a gas chromatography (GC) elution profile which comprises at least seven compounds selected from the group consisting of the following approximate GC elution times (in minutes): 5.21; 6.49; 7.59; 8.69; 8.8; 9.97; 10.05; 10.21; 10.78; 11.18; 11.84; 12.2: 12.33; 12.84. 13.0; and 13.62. More specifically, embodiments of this invention include flavouring composition comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 1 ("Flavour composition"), or Table 4 ("Reaction temperature: 500°C" or "560°C", or Table 6 ("Reaction temperature 500°C" or "560°C").

This invention also embraces food flavouring compositions, comprising the flavouring composition defined above together with other suitable food additives. This flavouring may be in a liquid, solid, sauce, cream, paste or powdered form.

Furthermore, this invention is directed to food to which has been applied the flavouring composition defined above. The food is selected from, but not exclusively limited to, meat, poultry, sea food, milk products, vegetables, deep fried, surface fried, baked, micro waved, barbequed, grilled, or snack foods.

BRIEF DESCRIPTION OF THE DRAWINGS

These and other features of the invention will become more apparent from the following description in which reference is made to the appended drawings wherein:

FIGURE 1 is a schematic of one fast pyrolysis process that can be utilized to produce grilled flavoured composition.

FIGURE 2 is a gas chromatography profile of (2A) a product of this invention; and a profile of (2B) a commercially available product produced using the process as disclosed in Schulman (US 4,820,538).

DESCRIPTION OF PREFERRED EMBODIMENT

In the following description, the corresponding elements, as shown in each figure of the drawings, are given the same reference number.

Figure 1 discloses a schematic of a transport fast pyrolysis reactor of type that can be utilized to make the grilled flavourings of the present invention. The feed stream of vegetable oil or fat enters the reactor radially through an animization nozzle (1) which is positioned just prior to the solid heat carrier separator, and/or just after the solid heat carrier separator, position (2), and/or just after the secondary solid separator, position (3). A heat-carried (hot sand, other solid, or hot carrier gas) is transported in a fluid (recirculation gas or nitrogen with up to 4% molar residual oxygen which is present from pressure tap purge ports; see below) and comes in contact with the atomized feedstock at anyone of the entry points.

In the reaction zones there is thorough and rapid mixing and conductive heat transfer from the heat carrier to the oil as the heat carrier transport gas and feed stock, with pyrolysis products, travels through the reactor system. In section (4) of the system the heat carrier is brought up to the desired approach temperature by means of electrical resistance heating, indirect combustion, direct combustion or a combination thereof. At the exit of the heat carrier heating system (4) the solid heat-carrier is quickly removed using a high-efficiency cyclone (5). Any fine solids which might avoid separation in this device are removed in a secondary separation means (6). After separation from the heat carrier, the pyrolysis products are rapidly quenched, resulting in an extremely short overall reaction residence time for the feedstock at the elevated temperatures.

The heat carrier together with other solids which are removed by the cyclonic separator are transferred to a heat carrier re-heating system (4). A noncondensible gas which is a byproduct of the high temperature reactions, is compressed in a blower and transferred to the re-heater (4) along with the solid heat carrier. In the re-heater (4), any organic deposits on the sand particles that were not removed in the cyclone separator, can be efficiently combusted by the addition of oxygen to the recirculation line (12) to help provide process heat and rid the sand of contaminants. Byproduct gases can also be combusted in the re-heater (4) to add to the reaction thermal energy demand.

Immediate quenching of the hot product gaseous/vapour stream from the cyclonic separators occurs in a direct conduct condensing system (7). A pump draws condensed liquid from the bottom of the condensing column and passes it through a heat exchanger (8). The cool product liquid is then sprayed back to the top of the direct contact column (7). Any liquids which are carried out of the direct contact collection system are removed in stainless steel demister (9) and fibreglass filter (10). Utilization of a secondary condenser (11) can also be used in order to improve the efficiency of the process.

The system operates between 485°C and 550°C with a vapour residence time of less than 1.0 seconds and it preferred a vapour residence time of between 50 to 300 milliseconds. The "vapour residence time" is defined as the period of time from the point at which the feed stock comes into contact with the hot inert heat carrier to the time that it is separated from the heat carrier and cooled in the primary condensers.

In any system of fast pyrolysis it is important to recognize that it is the entire period of time at which the feed stock and pyrolysis products are maintained at elevated temperatures that is critical. Any processes which can minimize this period of time will result in a preferred fast pyrolysis system.

The appropriate vegetable oils that are utilized in the present invention are those having a high stability, namely, those vegetable oils that are saturated or are partially saturated. Examples of appropriate vegetable oils would be saturated or partially saturated palm oil, soya oil, peanut oil, canola, corn oil or coconut oil. Alternative feedstocks include animal fats such as butter, beef tallow, etc. However, use of unsaturated vegetable oils results in unwanted side reactions which transform the pyrolysis products into undesirable tars, etc, and is to be avoided.

The process is conducted in a reductive atmosphere that is essentially free of oxygen or air. The only oxygen present is that which is necessary for pressure tap purging, or residual amounts that enter the system by reason of system limitations or leaks.

According to the present invention by "flavour note' it is meant the compound that gives rise to a flavour component of the compositions of this invention. The term "flavour note" and "compound" are used interchangeably. Specific flavour notes can be identified by analytical means such as detection following gas chromatography by a suitable detector, or by smell, or taste. Chemical analysis of the grilled flavouring composition made utilizing the present invention is set out in Table 2 (see Example 1, below). For comparative purposes, an analysis of the product made utilizing the Schulman patent is also set out.

It can be seen from Table 2 that the flavours notes that result from the present invention are markedly different from those obtained using the Schulman process even when using the same feedstock. In particular, in a comparative taste test panel, it was noted that the flavour profile of the present invention was more enhanced and of a rich, higher concentration (approximately twice as strong).

The process of the present invention is to be conducted at temperatures over 480°C (900°F) and preferably over 500°C to 550°C (930-1020°F). While the precesses of Schulman and DiCicca are performed at lower temperature

ranges, in the order of 313-370°C (600-700°F), and 150-475°C (300-890°F), respectively.

By reason of the absence or essential absence of oxygen from the reaction zone, the present process is endothermic, and it is a non-combustion process. This results in an entirely different series of reactions resulting in different products than those achieved utilizing the Schulman process. In addition, the shorter residence time and rapid quenching, result in a different product profile as is exemplified in Table 2.

The flavour compositions that are made utilizing the present invention are very strong and distinctive and as such, can be added with other flavourings resulting in a blended product. In addition, the product of the present invention can be utilized in a spray dried form associated with an appropriate carrier such as malto dextrin, starches, or other carriers as would be known to one of skill in the art. The blended product can then be applied to meats and other foods stuffs, including but not limited to, milk products, vegetables, deep fried, surface fried, baked, micro waved, barbequed, grilled, or snack foods, and sea foods for which it is desired to produce an enhanced flavour.

In addition, a blended flavouring can be sold directly to consumers, in the form of a liquid, solid, power, paste, sauce, or cream for applications to meats and other foods that are to be prepared. The grill flavourings of this invention and blends containing these flavourings can also be sold as microwave browners and flavour additives.

This invention will now be further described by references to the following examples:

Example 1

A mixture of partially hydrogenated soy and cottonseed oil (see table 1, below), was processed in the reaction system. The mixture was preheated to approximately 40°C (for ease of pumping), and injected into the reaction vessel. The reactor was maintained at a temperature of 504°C. The reaction residence time was determined to be 211 milliseconds (i.e. for the time of injection to the time of rapid quenching). The resultant liquid material was taste tested and found to posses a char-grilled flavour, suitable for application to foods.

Table I

Fatty acid profile and specifications of partially hydrogenated soy and cottonseed oil	
Carbon Number	%
12:0	1
14:0	1
16:0	9
16:1	1
18:0	5
18:1	5
18:2	78
18:3	trace
Iodine value	74-81
Flavour	bland
Smoke point	420-450°F

Characterization of reaction product

A sample of the product was extracted in propylene glycol and analysed using gas chromatography. For comparison, a sample of a commercially available natural grill flavour, prepared using the Schulman process with a feed stock comprising partially hydrogenated soybean/cottonseed oil and extracted in propylene glycol, was also analysed. A Varian Satr 3400CX gas chromatograph was used, fitted with a 30 meter x 0.25 mm I.D., 0.25 micron film thickness, J&W Scientific fused silica DB-Wax capillary column (catalog number #122-7032). The column was run at 40°C inital temp and ramped to 220°C at 10°C/min with a 5 minitue hold at 220°C. The carrier gas was hydrogen at 25 PSIG, and 1 microliter samples were injected onto the column.

Results of the peak areas are indicated in table 2, as are compounds that are of importance to the natural grill flavour. These compounds were determined by smelling each peak as it eluted from the GC through a heated "sniff port". Comparisons of the gas chromatography profiles are provided in figure 2A (the product of this example) and figure 2B (the commercially available product).

Table 2

Gas Chromatograph Area Counts From Water Extractions of products derived from partially hydrogenated soy and cottonseed oil prepared by the process of this invention ("Flavour composition") or by the process of US 4,820,538 ("Commercial product").

Time (min)	Important Flavour Notes	Peak Areas: Flavour composition	Peak Areas: Commercial product
0.969		44	
1.064		4779	7339
1.416		46	
1.809		31	
2.134		31	
2.543		38	
2.583		29	
3.153		41	
4.379		34	
4.538		43	
4.632		29	
4.736		36	
4.808		24	
5.212	*	92	92
6.199		37	
6.493	*	546	248
6.656		60	71
7.094		22	74
7.59	*	234	101
8.254		42	
8.36		28	150
8.492		28	
8.568		82	165
8.685	*	189	81
8.797	*	350	95
9.003		31	
9.098		21	
9.177		41	
9.972	*	184	61
10.053 '		241	
10.21	*	54	
10368		34	
10.784	*	168	
10.951		43	
11.179	*	110	
11.519		35	
11.839	*	141	
12.202	*	36	
12.325	*	33	
12.782		47	
12.835	*	59	
13.005	*	101	
13.381		22	
13.623	*	56	

Table 2 (continued)

Gas Chromatograph Area Counts From Water Extractions of products derived from partially hydrogenated soy and cottonseed oil prepared by the process of this invention ("Flavour composition") or by the process of US 4,820,538 ("Commercial product").			
Time (min)	Important Flavour Notes	Peak Areas: Flavour composition	Peak Areas: Commercial product
14.038		42	
14.296		36	
14.435		26	
14.594		50	
15.196		27	64
13.354		76	55
16.116		22	
16.296		30	240
16.586		48	
17.253		20	76
17.294		27	
17.542		36	
18.137		38	
18.185		24	
18.744		48	
19.102		48	
19.682		520	
20.098		26	
22.325		48	
22.177		34	
Total Area		9,631	8.912

As can be seen from Table 2 and figure 2, the product of this example comprises a more complex GC peak profile when compared with the commercially available product. Furthermore, this product has a greater variety of important flavour notes. A comparison of the peak areas of the GC profiles of the important flavour notes indicates up to a two fold increase in the product produced by this example (e.g. compare peaks areas at 6.493 min of 546 v 248 etc.). Furthermore, the commercially available product lacks the compliment of compounds eliciting important flavour notes observed after elution times greater than 10 min.

Example 2

A pure soybean oil (see Table 3) was processed under similar conditions to Example 1, at two different reactor temperatures of 500°C and 560°C.

Table 3

Soybean Oil Specifications	
Colour	15-Yellow - 1.5 Red max
Flavour	bland
Iodine value	124-139
Smoke point	218°C min

The reaction conditions were as follows:

Reactor temperature	500°C or 560°C
Residence time	151 ms

(continued)

Reactor velocity	61.6 ft/s
Feed Throughput rate	2600 lb/hr-ft^2

The resultant products were analysed by GC (Table 4)

Table 4

Gas Chromatograph Area Counts From Water Extractions of Products derived from Soybean Oil			
Time	Important Flavour Notes	Reaction temperature: 500°C	560°C
0.969		624	608
1.064		2777	2824
1.416			
1.809			27
2.134			19
2.543		18	55
2.583			
3.153			14
4.379			
4.538			
4.632			
4.736			23
4.808			
5.212	*		37
6.199			
6.493	*	85	136
6.656			
7.094			
7.59	*	36	102
8.254			
8.36			
8.492			
8.568			
8.685	*	36	180
8.797	*	40	64
9.003			
9.098			
9.177			
9.972	*	17	55
10.053	*	38	53
10.21	*	12	17
10.368			
10.784	*	31	41
10.951			
11.179	*	14	47
11.519			18
11.839 *		24	43
12.202	*	25	
12.325	*	36	128
12.782			
12.835	*	15	28

Table 4 (continued)

Gas Chromatograph Area Counts From Water Extractions of Products derived from Soybean Oil			
Time	Important Flavour Notes	Reaction temperature: 500°C	560°C
13.005	*	20	73
13.381			
13.623	*		
14.038			
14.296			
14.435			
14.594			
15.196			
15.354			
16.116			
16.296		69	66
16.586			
17.253			
17.294			
17.542			
18.137			
18.185			
18.744			
19.102			
19.682			
20.098			
22.325		119	
22.177			55
Total Area		4.096	5.156

The resultant liquid product of resulting form either reaction run had a sharper taste and lacked the broad flavour profile of Example 1. However, it still exhibited the char-grilled flavour of Example 1. It can also be seen that the composition of the 560°C reaction temperature product comprises higher levels of compounds than that of the lower, 500°C, run.

Example 3

A pure canola oil feedstock (see table 5) was processed at 500°C and 560°C with a reactor residence time of 130 ms. The feedstock was atomized and injected into the reactor followed by rapid quenching. The resultant liquid product was subsequently taste tested and analysed by GC (Table 6). The flavour profile exhibited some meaty flavour notes, however, it was found to be such weaker than the flavour composition of Example 1

Table 5

Canola Oil Specifications	
Colour	15 Yellow - 1.5 Red max
Flavour	bland
Iodine value	110-126
Smoke point	218°C

Products analysed by GC (table 6) indicate the presence of different amounts of between the two reaction temperature runs. An increase in the amount and occurrence of important flavour notes is observed with flavour composition produced by the higher reaction temperature run.

Table 6

Gas Chromatograph Area Counts From Water Extractions of Canola Oil			
Time	important Flavour Notes	Reaction temperature: 500°C / 560°C	
0.969			
1.064		3336	3462
1.416			
1.809			
2.134			
2.543			11
2.583			
3.153			
4.379			
4.538			
4.632			
4.736			
4.808			
5.212	*		14
6.199			
6.493	*	26	31
6.656			
7.094			
7.59	*		18
8.254			
8.36			
8.492			
8.568			
8.685	*	46	37
8.797	*		
9.003			
9.098			
9.177			
9.972	*		
10.053	*		
10.21	*		
10.368			
10.784	*		
10.951			
11.179	*	24	11
11.519			
11.839	*		12
12.202	*	16	65
12.325	*	97	
12.782			
12.835	*	40	
13.005	*	39	56
13.381			
13.623			
14.038			
14.296			

Table 6 (continued)

Gas Chromatograph Area Counts From Water Extractions of Canola Oil			
Time	important Flavour	Reaction temperature: 500°C / 560°C	
	Notes		
14.435			
14-594			
15.196			
15.354		20	
16.116			
16.296		61	65
16.586			
17.253			
17.294			
17.542			
18.137			
18.185			
18.744			
19.102			
19.682			
20.098			
22.325			26
22.177			
Total Areas		3,745	3,896

Example 4

A blended product was produced to achieve a grilled flavouring food that resembled the product of example 1 but having a slightly mellower flavour. This was achieved by adding feed stock comprising 80% hydrogenated soy and cottonseed oil (see Example 1, Table 1 for specifications) and 20% soybean oil (see Example 2, Table 3 for specifications). The feedstock was processed at 500°C with a reactor residence time of 170 ms. The feedstock was atomized and injected into the reactor followed by rapid quenching. The resultant liquid product was taste tested. The flavour profile was weaker than that observed with the product of Example 1, and exhibited more mellow overtones.

The present invention has been described with regard to prefered embodiments. However, it will be obvious to persons skilled in the art that a number of variations and modifications can be made without departing from the scope of the invention as described in the following claims.

Claims

1. A process for the preparation of a flavouring composition comprising:

   a) heating a spray or atomized droplets of a saturated or partially saturated vegetable oil to a temperature of at least 480°C in an oxygen starved atmosphere in a fast pyrolysis system within 1.0 second;
   b) maintaining said vegetable oil together with the pyrolysis products produced from said vegetable oil, at over 480°C for a period of time less than one second;
   c) rapidly quenching the pyrolysis products formed within 0.1 second;
   d) separating and collecting said liquid extract.

2. The process according to claim 1 wherein said vegetable oil is selected from the list comprising saturated or partially saturated palm oil, soya oil, peanut oil, canola, corn oil, coconut oil, animal fats, beef tallow, or butter.

3. The process of claim 1 wherein the vegetable oil is saturated or partially saturated soya oil.

4. The process of claim 2 wherein the vegetable oil is saturated or partially saturated soya oil.

5. A flavouring composition when made in accordance with the process of claim 1.

6. A flavouring composition when made in accordance with the process of claim 4.

7. A food flavouring comprising the flavouring composition of claim 5 together with other suitable food additives.

8. A food flavouring comprising the flavouring composition of claim 6 together with other suitable food additives.

9. The flavouring composition of claim 5 wherein the flavouring composition is in a liquid, solid, cream, sauce, paste, powdered or a spray dried form, associated with appropriate carriers.

10. The flavouring composition of claim 6 wherein the flavouring composition is in a liquid, solid, cream, sauce, paste, powdered or a spray dried form, associated with appropriate carriers.

11. The food flavouring composition of claim 7 wherein the flavouring composition is in a liquid, solid, cream, paste, powdered or a spray dried form, associated with appropriate carriers.

12. The food flavouring composition of claim 8 wherein the flavouring composition is in a liquid, solid, cream, paste, powdered or a spray dried form, associated with appropriate carriers.

13. Food to which has been applied the flavouring composition of claim 5.

14. The food of claim 13 which is selected from meat, poultry, sea food, milk products, vegetables, deep fried, surface fried, baked, micro waved, barbequed, grilled, or snack foods.

15. A flavouring composition characterized by a gas chromatography (GC) elution profile which comprises at least seven compounds selected from the group consisting of the following compounds characterized by the following approximate GC elution times (in minutes): 5.21; 6.49; 7.59; 8.69; 8.8; 9.97; 10.05; 10.21; 10.78; 11.18; 11.84; 12.2; 12.33; 12.84. 13.0; and 13.62.

16. The flavouring composition of claim 15 comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 2, "Flavour composition".

17. The flavouring composition of claim 15 comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 4, "Reaction temperature: 500°C".

18. The flavouring composition of claim 15 comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 4, "Reaction temperature: 360°C".

19. The flavouring composition of claim 15 comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 6, "Reaction temperature: 500°C".

20. The flavouring composition of claim 15 comprising a combination of compounds that give rise to a gas chromatography (GC) elution profile which approximates that of Table 6, "Reaction temperature: 560°C".

21. The flavouring composition of claim 15 wherein the flavouring composition is in a liquid, solid, cream, sauce, paste, powdered, or a spray dried form, associated with appropriate carriers.

22. Food to which has been applied the flavouring composition of claim 21.

23. The food of claim 22 which is selected from meat, poultry, sea food, milk products, vegetables, deep fried, surface fried, baked, micro waved, barbequed, grilled, or snack foods.

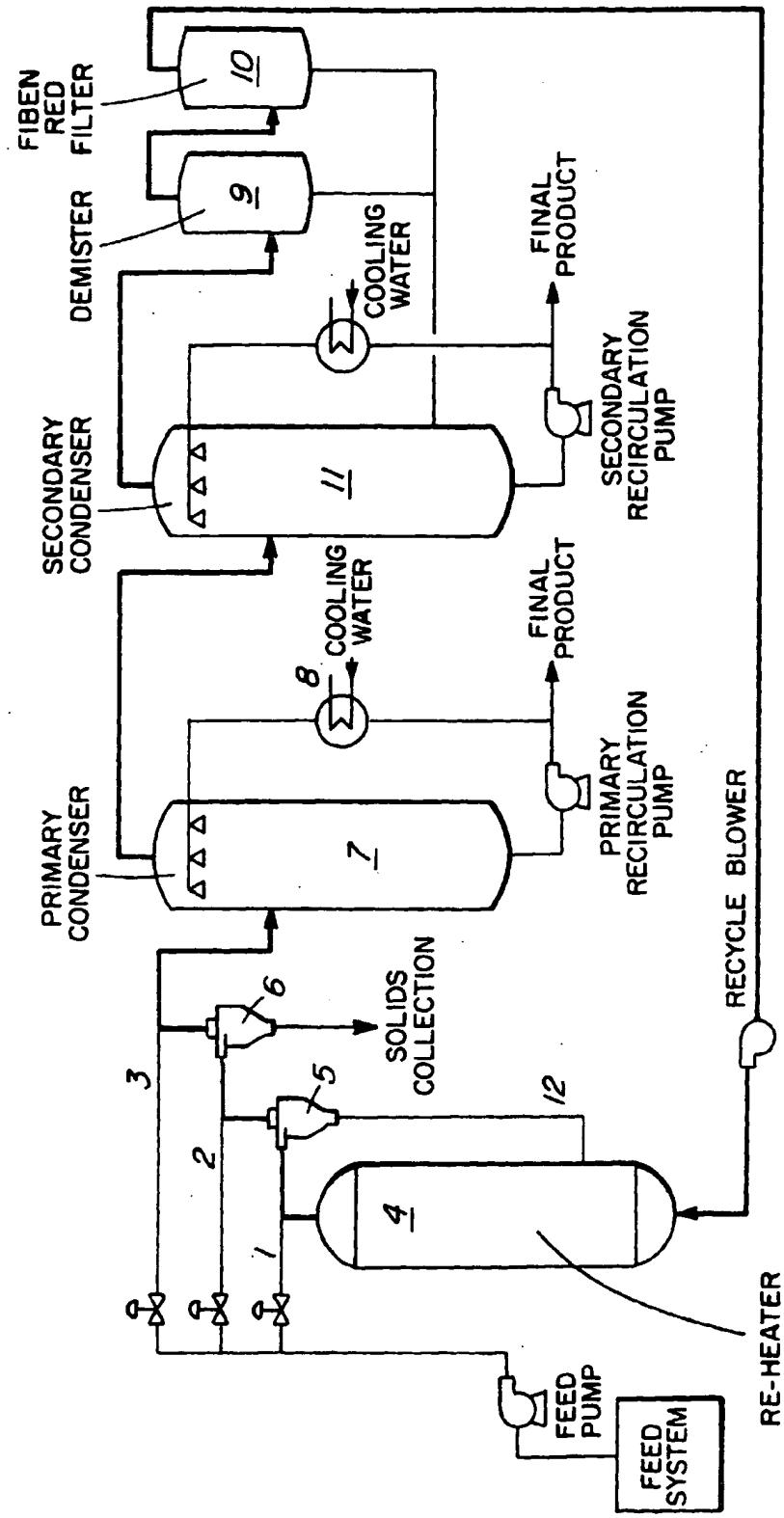
FIBEN RED FILTER
10
DEMISTER
9
COOLING WATER
FINAL PRODUCT
SECONDARY CONDENSER
11
SECONDARY RECIRCULATION PUMP
COOLING WATER
8
FINAL PRODUCT
PRIMARY CONDENSER
7
PRIMARY RECIRCULATION PUMP
RECYCLE BLOWER
6
SOLIDS COLLECTION
3
5
12
2
4
1
RE-HEATER HEAT CARRIER HEATING SYSTEM
FEED PUMP
FEED SYSTEM

FIG. 1

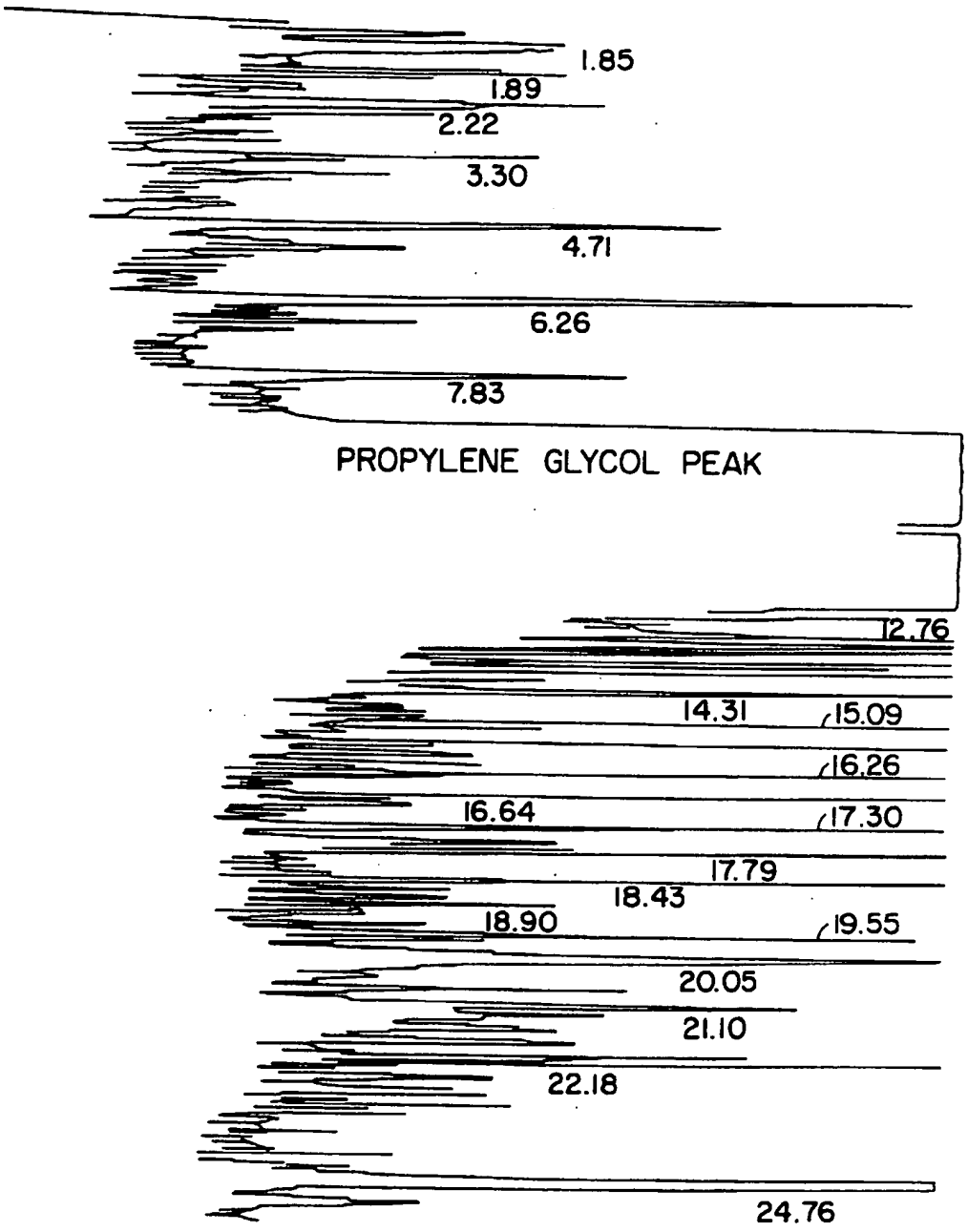
1.85
1.89
2.22
3.30
4.71
6.26
7.83
PROPYLENE GLYCOL PEAK
12.76
14.31
15.09
16.26
16.64
17.30
17.79
18.43
18.90
19.55
20.05
21.10
22.18
24.76

FIG. 2A

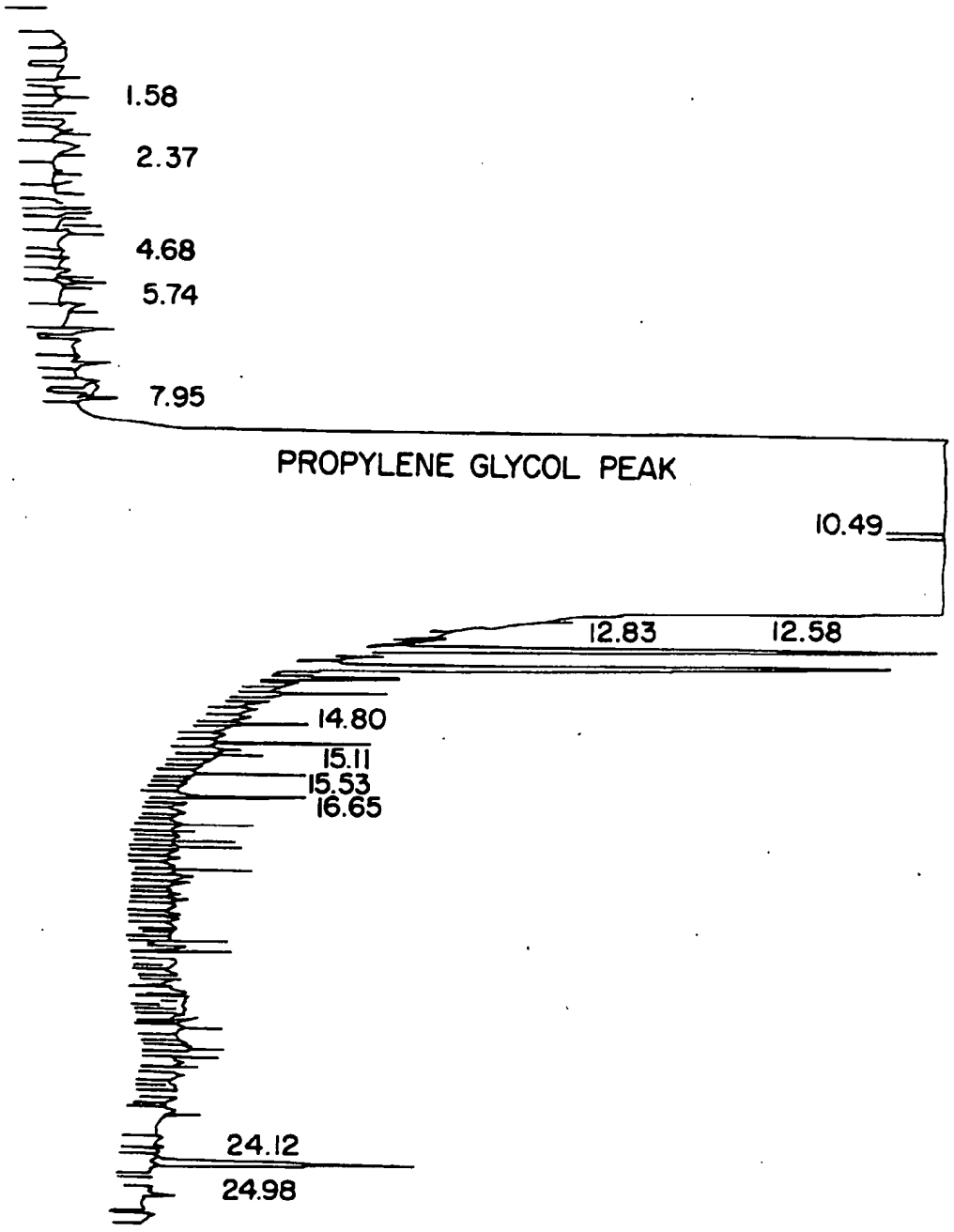
1.58
2.37
4.68
5.74
7.95
PROPYLENE GLYCOL PEAK
10.49
12.83
12.58
14.80
15.11
15.53
16.65
24.12
24.98

FIG. 2B

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 81 0204

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	NAZER J.M.A ET AL.: "Pyrolysis-GC Analysis as an Identification Method of Fats and Oils" JOURNAL OF FOOD SCIENCE, vol. 50, no. 4, - 1985 pages 1095-1100, XP002068436 * page 1095, right-hand column * * page 1097 *	1-23	A23L1/226
X	NAZER J.M.A AND YOUNG C.T.: "Effect of Various Pyrolysis Parameters on the Fragmentation Patterns of Peanut Oil" JOURNAL OF FOOD SCIENCE, vol. 49, no. 2, - 1984 pages 662-664, XP002068437 * page 662 *	1-23	
X,D	EP 0 356 799 A (NESTLE SA) 7 March 1990 * examples 1-4 *	1-23	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6) A23L

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	17 June 1998	Bendl, E

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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